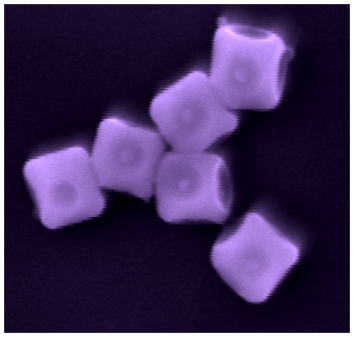
JMC15
15èmes Journées de la Matière Condensée
Bordeaux 22-26 août 2016

http://jmc15.sciencesconf.org/

CP1: Design, synthesis and assembly of patchy particles

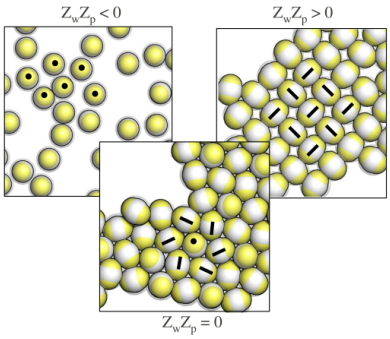
Contributions to this Minicolloquium should be given in English

Directional interactions, selective bonding mechanisms and valence are now considered as the key ingredients to design and manufacture complex mesoscopic structures with predefined properties. It is now possible to synthesize colloidal particles that can organize themselves into a plurality of structures by self- or directed assembly. These particles, generally referred to as "patchy" particles, are characterized by a heterogeneously modified surface such that a limited number of areas on their surface differ from the rest of the surface via their interaction properties. Through these patches the particles are able to develop selective and directional interactions.



Silica particles with 6 concave patches on their surface (S. Ravaine)

The formation of patches on the surface of colloidal particles can be done thanks to various chemical or physical synthesis methods: transfer printing of magnetic patches on the surface of particles, phase vapor deposition of metal patches, regioselective anchoring of DNA strands are only a few recent examples of synthetic processes of particular patches, which allow to highlight the multidisciplinary nature of this research field, including physics, chemistry, chemical engineering and biology.



Self-assembly scenarios in two dimensions of heterogeneously charged particles (E. Bianchi and G. Kahl)

Organizers:

Emanuela Bianchi
Erik Grelet
Gerhard Kahl
Serge Ravaine

Key words:

colloidal particles, patches, viruses, self-assembly, directional interactions

In recent years, considerable progress has been made regarding the control of the position, the number and the interactions of patches at the surface of colloidal particles. These experimental advances, if they are correlated with deep theoretical studies, make it possible to envisage numerous applications in different domains. Thus, close cooperation between experimentalists and theorists is paramount: modeling the behavior of patchy particles which can be experimentally produced can for instance enable one to predetermine the type of structures that can be obtained by self-assembly.